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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/821,092

04/08/2004

Francisco Juarez

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22891 7590 10/28/2008
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EXAMINER

MILLER, MICHAEL G

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

10/28/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/821,092	Applicant(s) JUAREZ ET AL.	
	Examiner MICHAEL G. MILLER	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 20-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 20-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 24 JUL 2008 have been fully considered but they are not persuasive.
2. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).
3. Applicant's first argument is that '287 does not teach a CVD process wherein excess precursor remains in the chamber at the time of enlarging. Examiner points to '535 PG0036 as the teaching in the combined references which teaches this concept. Specific mention of purging of residual gases is made therein.
4. Applicant's second argument is that '287 does not teach a CVD process in which the reaction chamber is enlarged to reduce the concentration of the first precursor. Examiner refers to the discussion of the ideal gas law in the previous Office Action, which explains how the reduction of the concentration by enlarging of the chamber is inherent.
5. Applicant's third argument is that '535 does not teach a mechanism for changing the chamber volume. Examiner points to '287 Column 3 Lines 53-65 for this functionality.

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6. Examiner maintains all previous grounds of rejection in the previous Office Action.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1-10 and 20-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Santiago et al (U.S. Patent 6,716,287, hereinafter '287) in view of Luo et al (U.S. PApub 2003/0059535, hereinafter '535).

a. Claim 1 - '287 teaches a reactor comprising a reactor chamber with a first volume, a pedestal to secure a substrate within the chamber using an electrostatic chuck, introducing a first gas into the chamber at this volume and exposing the substrate to this gas to deposit a first layer on the substrate, and lowering the pedestal to facilitate removal of the substrate while removing undeposited first gas from the chamber to end deposition (Column 3 Lines 8-24 and 53-65).

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b. '287 does not explicitly teach that the first gas is a precursor which reacts with the surface to form the first layer. '287 also does not explicitly teach that enlarging the reaction chamber reduces the concentration of the first gas.

c. '535 teaches cyclical ALD deposition of materials wherein a first reactive gas is passed into a chamber to react with a substrate and form a first layer. After the first layer is formed, the gas flow is stopped and unreacted first reactive gas is removed from the chamber via vacuum pump or purge operations (PG 0036). '535 discusses controlling process parameters to control the thickness of the reactively deposited film, including chamber pressure (PG 0031).

d. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the apparatus of '287 with the technique of '535. Both teachings wish to deposit coatings onto substrates; '535 teaches that controlling chamber pressure can control the thickness of the deposited layers; '287 teaches a means of controlling the chamber pressure by raising and lowering the pedestal (by the ideal gas law, $PV = nRT$, if the volume V above the substrate increases, the pressure P of the gas above the substrate must inherently decrease for constant nRT , which exists because the gas flow is stopped before expansion. Further, by the ideal gas law, $P/RT = n/V$, if the volume above the substrate increases, the concentration of the gas n/V above the substrate must inherently decrease for constant P/RT , which exists because the gas flow is stopped before expansion).

10. Claim 2 – the second precursor is taught in '535 PG 0036.

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11. Claim 3-4 – purging and pumping are taught in '535 PG 0036.
12. Claims 5-7 – this configuration is taught in '535 PG 0031.
13. Claim 8 – This is a combination of Claims 1, 2 and 5 and is rejected on those grounds.
14. Claims 9-10 - this configuration is taught in '535 PG 0031.
15. Claims 20-22 – '287 Column 3 Lines 37-43 discloses a showerhead with a perforated center section through which the process gases are dispersed into the chamber.
16. Claims 23 and 25 – '535 PG 0036 teaches using ammonia to deposit nitrogen. Nitrogen is distinct from ammonia.
17. Claims 24 and 26 – '535 PG 0036 teaches using hexachlorodisilane (HCD) to deposit silicon. Silicon is distinct from HCD.
18. Claims 27 and 28 – '287 teaches a flow restricting ring which consists of a side wall with lower chamfered corners. The upper corners of the pedestal proximate this side wall are also chamfered to define a gas flow orifice between the side wall and the pedestal. The pedestal does not contact the outer walls of the chamber but occupies a majority of the width of same chamber in cross-section. (Column 4 Lines 21-29, Figures 1 and 2).

Conclusion

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL G. MILLER whose telephone number is (571)270-1861. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael G. Miller/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792